

REMARKS

This reply is filed in response to the office action dated June 4, 2004.

Reconsideration of the application and the claims is respectfully requested.

Priority

The continuity data described in the first paragraph of the specification is amended as suggested in the office action.

Claim Objection

Claim 46 is amended to correct the spelling error of "semiconductor diode." The objection is now believed to be overcome.

Claim Rejections - 35 U.S.C. §112, first paragraph

Claims 33, 36-38, 42, 51, 55, 78, 80, 90, and 91 were rejected under 35 U.S.C. 112, first paragraph. Claims 51, 55, 90 and 91 are being canceled without prejudice. Applicants reserve the right to prosecute these claims in a continuation-in-part application. Rejections of claims 33, 36-38, 42, 78, and 80 are traversed respectfully for at least the following reasons.

With respect to claim 33, the specification describes various illustrative ways to tailor properties of a semiconductor diode. For instance, page 11 (e.g., lines 11-17) describes tailoring the bandgap and doping levels, which are examples of properties of a semiconductor. These properties permit adjusting of the Fermi levels, which for example, affect the ability to capture electrons from the metal into the semiconductor. Page 12 also describes modifying the Schottky barrier properties, for example, for enhancing one-way transmission. Accordingly, Applicants believe that the written description requirement under 35 U.S.C. §112, first paragraph is met.

With respect to claims 36-38, the specification discloses, for instance on page 12, "low" and "high" doping. To one skilled in the art, and as referred to in published technical papers in this technology, 1×10^{15} per cc is considered a low doping. 1×10^{18} per cc is considered high doping, also referred to as degenerative doping. MPEP §2163.02 states that "[t]he subject matter of the claim need not be described literally (i.e., using the same terms or *in haec verba*) in order for the disclosure to satisfy the description requirement." Applicants submit that a person skilled in the art would recognize that the written description provides support for claims 36-38 and the claims are at least implicitly and inherently supported in the originally filed disclosure.

With respect to claim 42, specification on page 11, lines 22-28 discloses that conduction band of the semiconductor may match an energy level of the adsorbates on the conducting surface, and how bias may be used to do so. Specification on page 13 lines 26-31 also discloses that one resonance may overlap another, or for instance, that the band center of one is within the band of the other, implying "approximately match" to one skilled in the art.

With respect to claims 78 and 80, the specification on page 13, line 13 discloses using one to tens of atomic metal monolayers of metal to form the conducting surface. Specification also discloses using quantum wells on the surface. Monolayers and quantum wells, for example, are known to those skilled in the art to be substantially flat. Specification on page 13, lines 14-25 discloses that reaction surface geometries, for example, may include steps and/or edge sites.

For at least the foregoing reasons, claims 33, 36-38, 42, 78, and 80 meet the 35 U.S.C. §112, first paragraph requirement.

Claim Rejections – 35 U.S.C. §112, second paragraph

Claims 36-38, 51, 78, 80 were rejected under 35 U.S.C. 112, second paragraph.

Claims 36-38 are amended to include the word "between." The omission appears to have been a pure clerical or grammatical error, accordingly, Applicants respectfully request that this rejection be withdrawn in favor of a claim objection. For instance, MPEP §2173.02 states, "[i]n reviewing a claim for compliance with 35 U.S.C. §112, second paragraph, the examiner must consider the claim as a whole to determine whether the claim apprises one of ordinary skill in the art of its scope and, therefore, serves the notice function required by 35 U.S.C. 112, second paragraph >by providing clear warning to others as to what constitutes infringement of the patent<." Applicants believe that claims 36-38 reciting a doping range serve the notice function sufficiently to those skilled in the art even without the term "between." Accordingly, Applicants respectfully request that the rejections be changed to objections.

Claim 51 is canceled without prejudice.

The rejections of claims 78 and 80 are respectfully traversed for at least the following reasons. According to MPEP §2173.05(b) D., specification can provide general guidelines to render a limitation that contains the word "substantially" definite. Analogously, the terms "substantially flat" and "substantially stepped" are definite in view of the specification in the instant application that discloses that the conducting surface or catalysts may be formed, for example, as (but not limited to) steps, edges, clumps, monolayers, clusters, ridges, quantum dots, quantum wells, or quantum stadia.

Double Patenting

With respect to the provisional double patenting rejections over co-pending co-


owned applications, U.S. Patent Application Nos. 09/682,363; 10/052,004; 10/185,086; 10/218,706; and the double patenting rejections over co-owned patents, U.S. Patent Nos. 6,114,620; 6,218,608; 6,222,116; 6,268,560; 6,327, 859; 6,649,823; 6,678,305; 6,700,056, it is believed that the claims in the present application are not obvious over the claims recited in those applications and patents. Accordingly, Applicants respectfully request that the double patenting rejection be withdrawn.

In addition to the patents and applications cited in the office action, Applicants request that the following applications, which have common assignee and common inventorship be considered and be made of record in this application: U.S. Patent Application No. 09/631,463; U.S. Patent Application No. 10/759,341.

Reconsideration of the claims is respectfully requested. The claims are believed to be patentable and a favorable Office Action is hereby earnestly solicited. If a telephone interview would be of assistance in advancing prosecution of the subject application, the Examiner is requested to telephone the number provided below.

Respectfully submitted,

Date: September 7, 2004



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